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A Revision of the Subgenus *Calomelissa* of the Genus *Andrena* (Hymenoptera, Andrenidae) of Eastern Asia^{1),2)}

XU Huan-li

Institute of Zoology, Academia Sinica, Beijing 100080, China

and

Osamu TADAUCHI

Entomological Laboratory, Faculty of Agriculture Kyushu University,
Fukuoka, 812–81 Japan

Abstract East Asian species of the subgenus *Calomelissa* of the genus *Andrena* are revised, and 5 species are recognized from China, Japan and Korea. Three new species, *Andrena* (*Calomelissa*) *pieli*, *A.* (*C.*) *subvelutina* and *A.* (*C.*) *leucofimbriata* are described from China. A key to species of *Calomelissa* in eastern Asia is presented.

Key words: Andrenidae; *Andrena*; *Calomelissa*; eastern Asia; new species

Introduction

The subgenus *Calomelissa* of the genus *Andrena* was erected by HIRASHIMA and LABERGE based on 4 Japanese species (HIRASHIMA, 1963). They were divided into 2 species groups, the *prostomias* and the *mitakensis* groups. HIRASHIMA and TADAUCHI (1975) erected a new subgenus, *Oreomelissa*, to accommodate species of the *mitakensis* group. So far as we know, 2 species, *A. prostomias* from Japan (PÉREZ, 1905; HIRASHIMA, 1963) and *A. tsukubana* from Japan (HIRASHIMA, 1957, 1963) and Korea (KIM & KIM, 1983), belong to this subgenus. In the present study, we examined all the specimens of *Calomelissa* preserved in the Institute of Zoology, Academia Sinica, Beijing, and the Entomological Laboratory, Kyushu University, Fukuoka. We recognize 5 species including 3 new species from China and present a key to species of *Calomelissa* in eastern Asia.

Terminology, abbreviations and style of description in the present study follow TADAUCHI and XU (1995). The holo- and paratypes are preserved in the collection of the Institute of Zoology, Academia Sinica and some paratypes

¹⁾ Results from the China-Japan Co-operative Study on "Studies on Systematics, Evolution and Biogeography of Asian *Andrena* (Hym., Apoidea, Andrenidae)" No. 2.

²⁾ Contribution from the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka (Ser. 4, No. 66).

are in the Entomological Laboratory, Kyushu University.

Subgenus *Calomelissa* HIRASHIMA et LABERGE

Calomelissa HIRASHIMA & LABERGE, 1963, J. Fac. Agr., Kyushu Univ., **12**: 241. Type species:
Andrena prostomias PÉREZ, 1905.

Diagnosis. Propodeal enclosure large; dorsal face of propodeum finely tessellate with weak punctures; mesepisternum scarcely roughened, smooth to finely tessellate; propodeal corbícula scanty; tibial scopa dense, well developed; male clypeus yellow.

Key to species of *Andrena* (*Calomelissa*) in eastern Asia

Female

1. Clypeus reflected apically2
- Clypeus not reflected apically3
2. Clypeus flat; vertex with dark brownish hairs; genal area broadly and weakly tessellate; propodeal enclosure rugose on basal 2/3 with lateral margins convex outwardly in the middle; facial fovea dark brownish above; Japan*prostomias* PÉREZ
- Clypeus slightly convex; vertex with light white hairs; genal area broadly smooth and shiny; propodeal enclosure less rugose with lateral margins not convex outwardly in the middle; facial fovea whitish above; China (Zhejiang Prov.)*pieli* n. sp.
3. Mesoscutum with yellowish subvelvety hairs; China (Fujian and Zhejiang Provs.) [additional useful characters: facial fovea deeply engraved on upper end and nearly same width both on upper and lower areas; propodeal enclosure finely tessellate all over]*subvelutina* n. sp.
- Mesoscutum without subvelvety hairs4
4. Antennae brownish beneath; clypeus with a median longitudinal, impunctate, convex line above; mesoscutum and mesepisternum weakly tessellate; metasomal terga with minute punctures; Japan and Korea (south)*tsukubana* HIRASHIMA
- Antennae reddish brown beneath; clypeus without a median longitudinal, impunctate, convex line above; mesoscutum and mesepisternum smooth and polished; metasomal terga with dense, distinct punctures; China (Beijing, Sichuan & Yunnan Provs.)*leucofimbriata* n. sp.

Male

1. Propodeal enclosure finely tessellate all over; malar space about 1/5 times

- as long as base of mandible; [process of labrum large, convex, emarginate at apex] *subvelutina* n. sp.
- Propodeal enclosure rugose; malar space linear 2
2. Clypeus nearly flat, reflected apically; [process of labrum subprotuberant] *prostomias* PÉREZ
- Clypeus broadly convex, not reflected apically 3
3. Mesoscutum and mesepisternum weakly tessellate with indistinct, shallow punctures *tsukubana* HIRASHIMA
- Mesoscutum and mesepisternum smooth and polished with distinct punctures *leucofimbriata* n.sp.

1. *Andrena* (*Calomelissa*) *prostomias* PÉREZ

(Figs. 1–3)

Andrena prostomias PÉREZ, 1905, Bull. Mus. d'Hist. nat. Paris, **11**: 34 [female; Japan]; COCKRELL, 1913, Ann. Mag. nat. Hist., (8) **11**: 189 [female in key; Japan]; YASUMATSU, 1941, Peking nat. Hist. Bull., **15**: 279 [in list; Japan].

Andrena (*Calomelissa*) *prostomias*: HIRASHIMA, 1963, 242 [female & male; Japan]; HIRASHIMA, 1966, J. Fac. Agr., Kyushu Univ., **14**: 111 [female in key; Japan], 113 [male in key; Japan]; TADAUCHI, 1989, A Check List of Jap. Insects, 683 [in list; Japan].

Distribution. Japan (Honshu, Shikoku, Kyushu).

Floral records. *Deutzia crenata*; *Deutzia sieboldiana*.

Flight records. Female: late May to late June. Male: early to late June.

Type material. Holotype female (Mus. d'Hist. nat., Paris): Yokohama, Japan (M. HARMAND).

Parasite. Unknown.

Remarks. This species is mainly associated with the flowers of *Deutzia crenata*.

2. *Andrena* (*Calomelissa*) *pieli* n. sp.

(Figs. 4 & 5)

Female. BL 9.8–10.5 mm, WL 8.5–8.8 mm ($n=3$).

Color. Flagellum reddened beneath; mandible with apical third or more reddened; wing membranes smoky, veins and pterostigma brownish; tibial spurs yellowish brown; distitarsi reddish brown; posterior margins of metasomal terga narrowly brownish.

Pubescence: Hairs on head sparse except for antennal area with dense white hairs; those on clypeus short (250–400 μ), light brownish; those on vertex and genal area whitish; facial fovea whitish; hairs on mesoscutum relatively dense, short (250–350 μ), pale yellowish; those on mesepisternum long (500–750 μ),

whitish; propodeal corbicula white, not well arranged, with internal hairs sparse, simple, fine; trochanteral floccus imperfect, white; femoral floccus dense; tibial scopa composed of long simple, white hairs; hairs on metasomal terga (T) scanty; T₂₋₄ with sparse, appressed, obscure, white hair fringes postlaterally, T₅ and caudal fimbria pale brownish.

Structure. *Head:* HL/HW = 0.88 ± 0.03 ($0.86-0.91$, $n=3$), HW : MsW : MtW = 3.0 : 3.0 : 3.1. Vertex slightly rounded in frontal view. OOD : POD : OCD = 0.8 : 0.3 : 0.5. Antennae with flagellar segment 1 (FL₁) = FL₂₊₃, FL₂ as broad as long. Eyes with inner margins subparallel. Facial fovea broad, shallow, FVL = 1.3 mm, FVW = 0.5 mm. Clypeus slightly convex and reflected apically, distinctly smooth and shiny, with shallow PP ϕ 30 μ and IS = 1-4, irregular in distribution, CPL = 1.0 mm. Process of labrum small, about twice as broad as long, emarginate apically. Lower paraocular area smooth with sparse PP irregular in size and distribution. Genal area broad, GW : EW = 0.9 : 0.5, with sparse minute PP, surface broadly smooth and shiny near eye, shagreened posteriorly. *Mesosoma:* Pronotum weakly tessellate, with weak, sparse PP; pronotum with lateral suture rather long. Mesoscutum weakly tessellate, with weak PP ϕ 20-30 μ and IS = 1-1.5. Scutellum smooth and shiny anteriorly, nearly shagreened with dense, roughened PP posteriorly. Propodeal enclosure well defined, with lateral margins not convex outwardly like *A. prostomias*, rugose on basal half, densely tessellate apically; dorsal face of propodeum weakly tessellate, with PP ϕ 20 μ and IS = 1. Mesepisternum weakly tessellate with more or less denser PP than those of mesoscutum. *Metasoma:* Metasomal terga smooth and shiny, T₁ with minute PP ϕ 10-15 μ and IS = 1-3, T₂₋₄ with denser PP, IS = 1; posterior depressions of terga slightly indicated. Pygidial plate V-shaped with rounded apex, with moderately raised internal triangular area.

Male. Unknown.

Distribution. China (Zhejiang Prov.).

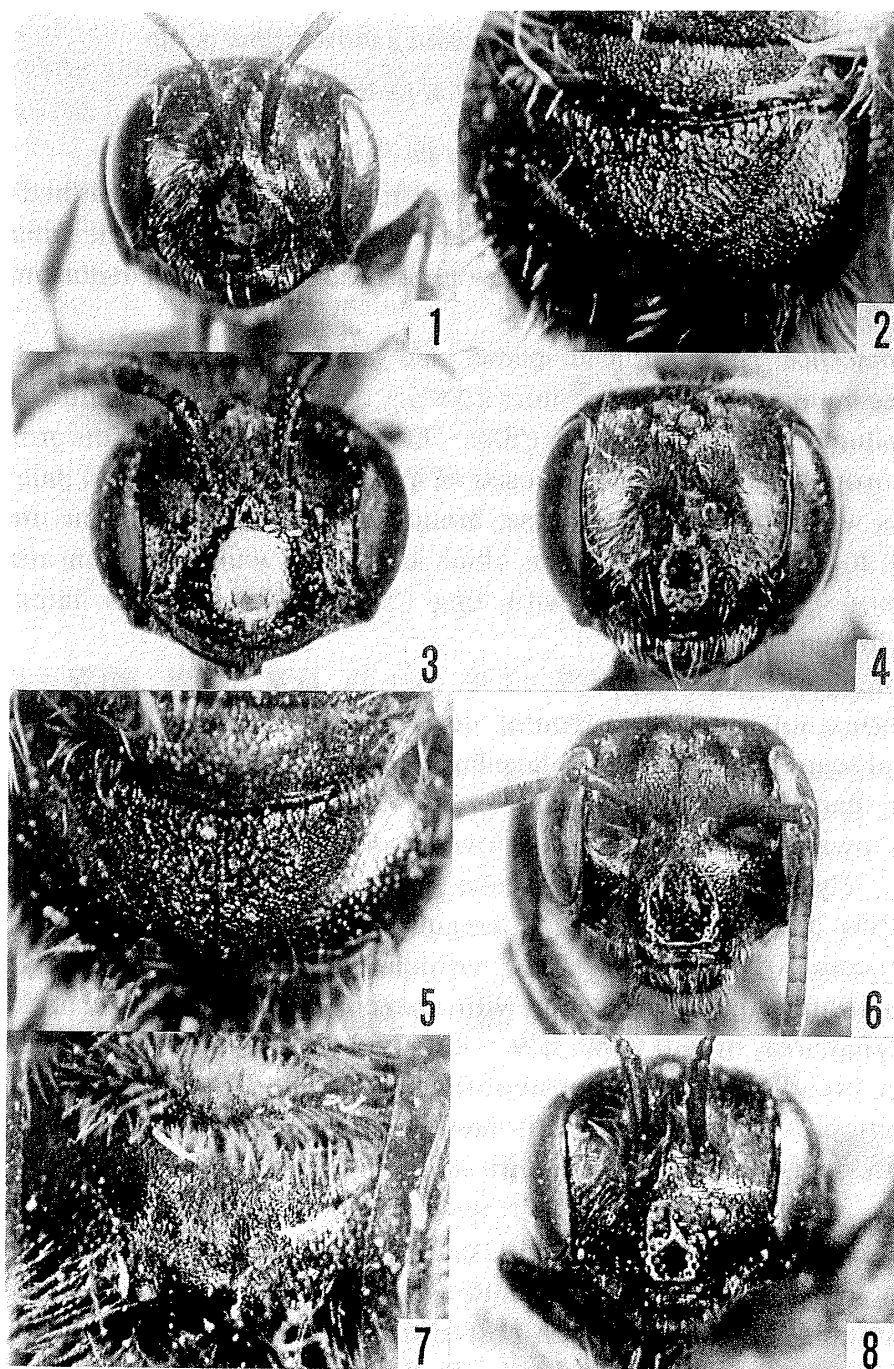
Floral record. Not available.

Flight record. Female: mid June.

Type material. Holotype female, Tianmushan, Zhejiang Prov., China, 12. vi. 1936 (O. PIEL). Paratypes: [China]: 5 females, same data as holotype.

Parasite. Unknown.

Remarks. This new species is a close relative of *A. prostomias* PÉREZ, but differs from it by the smaller size, the facial fovea whitish above, the clypeus slightly convex, the vertex without brownish hairs, the propodeal enclosure less rugose with lateral margins not convex outwardly in the middle and the caudal fimbria pale brownish.



Figs. 1-8. East Asian *Andrena* (*Calomelissa*). Heads in frontal view, 1: *prostomias*, female; 3: the same, male; 4: *pieli* n. sp., female; 6: *subvelutina* n. sp., female; 8: *tsukubana*, female. Propodeums in dorsal view, 2: *prostomias*, female; 5: *pieli* n. sp., female; 7: *subvelutina* n. sp., female.

3. *Andrena (Calomelissa) subvelutina* n. sp.

(Figs. 6–7 & 13–15)

Female. BL 12.8 mm, WL 9.9 mm ($n = 1$).

Color. Flagellum reddish brown beneath; mandible with apical third reddened; wing membranes smoky, veins and pterostigma brownish; tibial spurs reddish yellow; distitarsi reddish brown; posterior margins of metasomal terga broadly brownish.

Pubescence: Hairs on head sparse, pale yellowish except for vertex brownish; those on mesoscutum very short ($200\ \mu$), dense subvelvety, yellowish; those on scutellum, metanotum longer ($500-700\ \mu$), yellowish; those on propodeum scanty; propodeal corbícula composed of sparse, not well arranged, pale yellowish hairs with internal hairs sparse, branched; trochanteral floccus imperfect; femoral floccus dense, dull white; tibial scopa dull white; hairs on metasomal terga very sparse, brown; T_5 with long ($500-750\ \mu$), fuscous hairs; caudal fimbria brown.

Structure: Head: $HL/HW = 0.93$ ($n = 1$), $HW : MsW : MtW = 3.5 : 3.3 : 3.3$. Vertex not rounded in frontal view. $OOD : POD : OCD = 0.7 : 0.3 : 0.5$. Antennal scape slightly $>$ first 4 flagellar segments; $FL_1 > FL_{2+3}$, $FL_2 < FL_3$, FL_2 broader than long, FL_3 as long as broad. Eyes with inner margins diverging slightly toward mandibles. Facial fovea broad, deep, $FVL = 1.5$ mm, $FVW = 0.5$ mm. Clypeus flat, slightly concave medially, smooth, shiny, scattered with sparse $PP\phi$ $20-60\ \mu$ and $IS = 1-4$, irregular in size and distribution, $CPL = 1.0$ mm. Process of labrum very short, wrinkled and emarginate apically. Lower paraocular area smooth and shiny with sparse PP irregular in size and distribution. Genal area broad, $GW : EW = 1.0 : 0.6$, with minute PP , surface smooth near eye, broadly shagreened posteriorly. **Mesosoma:** Pronotum tessellate, with weak, obscure PP ; pronotum with lateral suture weak and long. Mesoscutum weakly tessellate anteriorly, smooth and shiny posteriorly with close, distinct $PP\phi$ $20-30\ \mu$ and $IS = 0.5-1$. Propodeal enclosure finely tessellate all over. Mesepisternum finely tessellate with sparse, minute, obscure PP . **Metasoma:** T_1 smooth and shiny with sparse, minute $PP\phi$ $10-15\ \mu$ and $IS = 1-3$; T_{2-4} weakly tessellate anteriorly and smooth posteriorly with denser PP ; posterior depressions of terga broad, well indicated. Pygidial plate U-shaped, with moderately raised, internal triangular area.

Male. BL 9.1 mm, WL 7.9 mm ($n = 1$).

Color: Flagellum reddish brown beneath; clypeus with yellow patch medially; mandibles reddened apically; wings smoky; legs reddish brown; posterior margins of metasomal terga reddish brown subhyaline.

Pubescence: Hairs on head and thorax short ($200-400\ \mu$), sparse; those on clypeus, vertex pale yellow; those on genal area whitish; those on mesoscutum

and sides of scutellum yellowish brown; those on propodeum, mesepisternum, legs dull white; those on metasomal terga scanty except for T_{5-6} with long ($600-700\mu$), sparse, yellowish hairs.

Structure: Head: Antennae with $FL_1 = FL_{2+3}$. Clypeus smooth, shiny with very scattered, shallow PP. Process of labrum moderate, convex, emarginate apically. Malar space about $1/5$ times as long as base of mandible. Genal area broader than eye seen in profile. *Mesosoma:* Mesoscutum with sparse, fine PP. Scutellum smooth, shiny. Propodeum weakly tessellate. Legs slender as usual. *Metasoma:* Metasomal terga moderately tessellate, with sparse, fine PP; posterior depressions of terga narrow, not well indicated. Genitalia and subgenital sterna as illustrated (Figs. 13–15), the former destroyed in part.

Distribution. China (south: Zhejiang, Fujian Provs.).

Floral record. Not available.

Flight records. Female: late March to early June. Male: mid March.

Type material. Holotype female, Moganshan, Zhejiang Prov., China, 20. v. 1932 (O. PIEL). Paratypes: [China]: 1 male, Shaoguan, Fujian Prov., 20. iii. 1960 (C. L. MA); 9 females, Jianyang, Fujian Prov., 30. iii.–6. vi. 1960 (C. L. MA); 1 female, Hang Zhou, Zhejiang Prov., 18. v. 1973 (S. F. WANG).

Parasite: Unknown.

Remarks. This new species is similar to *A. prostomias* PÉRZE and *A. pieli* n. sp., but is distinguished from them by the mesoscutum with subvelvety yellowish hairs, the propodeal enclosure not roughened and finely tessellate all over, and the clypeus not reflected apically.

4. *Andrena* (*Calomelissa*) *tsukubana* HIRASHIMA

(Figs. 8 & 9)

Andrena tsukubana HIRASHIMA, 1957, 55 [female & male; Japan].

Andrena (*Calomelissa*) *tsukubana*: HIRASHIMA, 1963, 245 [female & male; Japan]; HIRASHIMA, 1966, J. Fac. Agr., Kyushu Univ., **14**: 111 [female in key; Japan], 113 [male in key; Japan]; KIM & KIM, 1983, 6 [in list; Korea]; TADAUCHI, 1989, A Check List of Jap. Insects, 683 [in list; Japan].

Distribution. Japan (Honshu, Shikoku, Kyushu); Korea (south).

Floral records. *Deutzia crenata*; *Abelia serrata*; *Erigeron philadelphicus*; *Castanea crenata*.

Flight records: Female: late April to late June. Male: late April to early July.

Type material. Holotype male (Kyushu Univ., Fukuoka): Minamihata, Prov. Chikuzen (=Fukuoka Pref.), Japan, 5. vi. 1949 (Y. HIRASHIMA).

Parasite. Unknown.

Remarks. This species is mainly associated with the flowers of *Deutzia crenata*.



Figs. 9–12. East Asian *Andrena* (*Calomelissa*). Metasomal terga 3 & 4 showing hair bands and puncture distribution, 9: *tsukubana*, female; 11: *leucofimbriata* n. sp., female. Heads in frontal view, 10: *leucofimbriata* n. sp., female; 12: the same, male.

5. *Andrena* (*Calomelissa*) *leucofimbriata* n. sp.

(Figs. 10–12 & 16–20)

Female. BL 9.0–10.1 mm, WL 7.8–8.1 mm ($n=2$).

Color: Flagellum reddish brown beneath; mandible with apical third reddened; wing membranes hyaline, moderately pale brownish, veins and pterostigma brownish; tibial spurs ocherous, distitarsi yellowish brown; posterior margins of metasomal terga narrowly brown.

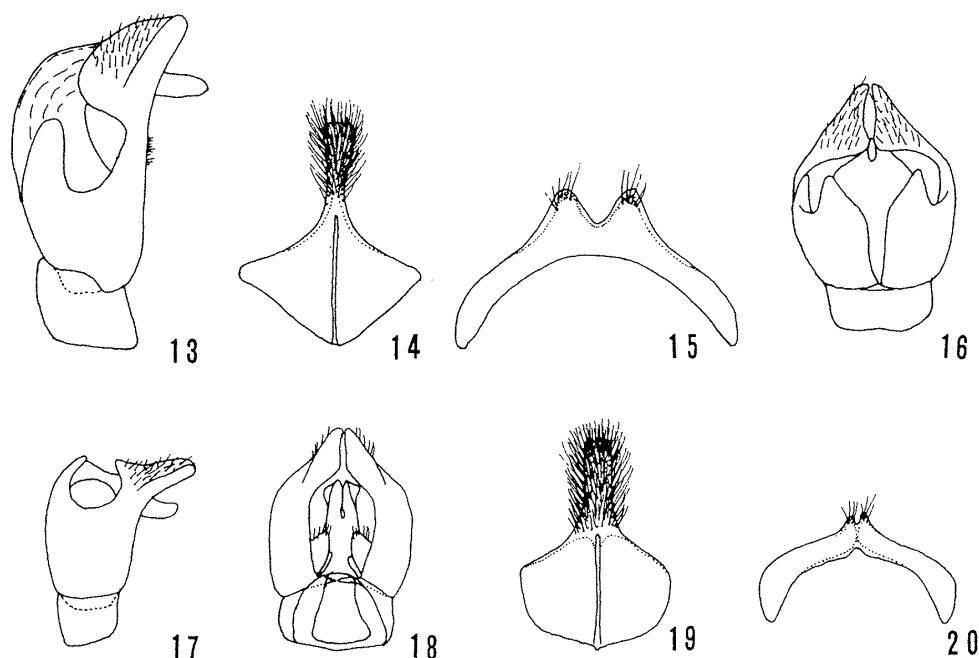
Pubescence: Hairs on head short ($200-350\mu$), whitish; those on clypeus sparse; those on antennal area dense; those on vertex not mixed with brownish; facial fovea brown above, white below; hairs on mesoscutum scanty, short ($150-250\mu$); those on mesepisternum relatively long ($400-500\mu$), whitish; propodeal corbicula with long ($600-800\mu$), not well arranged whitish hairs; interior of corbicula with sparse, fine, simple hairs; trochanteral floccus imperfect, silvery white; femoral floccus dense; tibial scopa composed of simple, white hairs; hairs on metasomal terga scanty; T_2 with short (250μ), appressed dense white hair band laterally, T_{3-4} with complete; hairs on T_5 brownish medially, white laterally; caudal fimbria dark brownish.

Structure: **Head:** $HL/HW=0.90\pm0.05$ ($0.80-0.93$, $n=3$), $HW:MsW:MtW=2.5:2.6:2.6$. Vertex slightly rounded in frontal view. $OOD:POD:$

OCD=0.7 : 0.3 : 0.4. Antennal scape < first 4 flagellar segments, $FL_1 = FL_{2+3}$, $FL_2 = FL_3$, FL_2 and FL_3 slightly broader than long, respectively. Eyes with inner margins subparallel. Facial fovea broad, FVL=1.2 mm, FVW=0.5 mm. Clypeus convex, smooth with very weak tessellation, with very weak PP ϕ 20–40 μ and IS=1–4, irregular in size and distribution; clypeus without a longitudinal, impunctate, convex line above, CPL=0.8 mm. Process of labrum large, transverse, about 3 times as broad as long. Lower paraocular area smooth with distinct, dense PP. Genal area relatively broad, GW : EW=0.7 : 0.4, with weak, dense PP, surface weakly tessellate near eye, shagreened posteriorly. *Mesosoma*: Pronotum very weakly tessellate, with weak PP, with lateral suture long. Mesoscutum smooth, shiny, with PP ϕ 20–40 μ and IS=1–2. Scutellum smooth, shiny with PP irregular in distribution. Propodeal enclosure coarsely rugose on basal 2/3, shagreened apically. Mesepisternum smooth and very weakly tessellate with PP ϕ 20 μ and IS=1–2. *Metasoma*: Metasomal terga smooth and shiny with dense, distinct, small PP; T_1 with PP ϕ 20 μ and IS=1.5–2; the rest of terga with closer PP (IS=1); posterior depressions of terga narrow, not well indicated. Pygidial plate V-shaped, with moderately raised, internal, triangular area.

Male. BL 7.5 mm, WL 6.6 mm ($n=1$).

Color: Flagellum reddish brown beneath; clypeus with a large yellow patch



Figs. 13–20. Genital capsule and subgenital sternum of *Andrena* (*Calomelissa*). 13–15: *subvelutina* n. sp., 13: lateral view of genital capsule; 14: 8th sternum; 15: 7th sternum. 16–20: *leucofimbriata* n. sp., 16: dorsal view of genital capsule; 17: lateral view of the same; 18: ventral view of the same; 19: 8th sternum; 20: 7th sternum.

including black spot on each lateral side; mandible with apical half reddened; legs brownish; posterior margins of metasomal terga reddish brown transparent.

Pubescence: Hairs on antennal area, vertex, genal area sparse, white mixed with brownish; those on clypeus brownish; those on mesoscutum short ($400\text{--}500\ \mu$), brown mixed with white in the middle; those on propodeum, mesepisternum long ($700\text{--}1000\ \mu$), pale white; T_1 with short ($300\ \mu$), white, erect hairs; T_{2-4} with fringes of depressed, white short ($250\ \mu$) hairs.

Structure: Head: Head relatively small, slightly broader than thorax seen from above. Antennae with $FL_1 < FL_{2+3}$, FL_2 broader than long, FL_3 as broad as long. Clypeus smooth, shiny with sparse PP, irregular in size and distribution. Process of labrum small, transverse. Genal area broader than eye seen in profile. *Mesosoma*: Mesoscutum smooth and polished with sparse PP ϕ $30\text{--}40\ \mu$ and $IS=1$, which are stronger than those on *A. tsukubana*. Propodeal enclosure rugose on basal half, moderately tessellate apically. Mesepisternum smooth and polished with strong PP ϕ $30\text{--}50\ \mu$ and $IS=1\text{--}2$. Wings with 2nd submarginal cell receiving 1st recurrent vein near end of the cell. Legs slender as usual. *Metasoma*: Metasomal terga smooth, shiny, with dense, small PP ϕ $20\ \mu$ and $IS=1\text{--}2$; posterior depressions of terga narrow, not well indicated. Genitalia and subgenital sterna as illustrated (Figs. 16–20).

Distribution. China (Beijing, Sichuan & Yunnan Provs.).

Floral record. Not available.

Flight records. Female: early June to early July. Male: late May to early June.

Type material. Holotype female, Badalin, Beijing, China, 9. vi. 1964 (S. M. GE). Paratypes: [China]: 1 female, same data as holotype; 2 females & 1 male, same data as holotype except 5. vi. 1964; 1 male, Shanbao, Beijing, 22. v. 1973 (Y. S. SHI); 2 males, Beihuashan, Beijing, 31. v. 1973 (Y. S. SHI); 3 females, Xiangchen, Sichuan Prov., 21. vi. 1982 (S. Y. WANG); 1 male, same locality as above, 27. v. 1982 (X. Z. ZHANG); 1 female, Zhongmin, Yunnan Prov., 10. vii. 1982 (S. Y. WANG).

Parasite. Unknown.

Variation. Specimens collected from Sichuan & Yunnan Provinces of China differ from those from Beijing in having the vertex mixed with brownish hairs and the metasomal terga with weaker punctures and the metasomal hair bands less developed.

Remarks. This new species is a close relative of *A. tsukubana* HIRASHIMA, but can be separable from it by the metasomal terga with stronger punctures, the antennae reddish brown beneath, the clypeus without a median longitudinal, impunctate convex line above.

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New Records of Some Boreal Leafhoppers (Homoptera, Cicadellidae) from Japan

Masami HAYASHI

Department of Biology, Faculty of Education,
Saitama University, Urawa, 338 Japan

Key words: Homoptera; Cicadellidae; Japan; new record.

The depositories of material examined are abbreviated as follows: [HUS] Hokkaido University, Sapporo; [NSMT] National Science Museum, Tokyo; [NIAES] National Institute of Agro-Environmental Sciences, Tsukuba; [EUM] Ehime University, Matsuyama; [SUU] Saitama University, Urawa. I am much indebted to Prof. S. TAKAGI and Dr. M. SUWA (HUS), Mr. M. TOMOKUNI (NSMT), Mr. K. KONISHI (NIAES), Prof. M. SATÔ (Nagoya Women's University), and Dr. N. OHBAYASHI and Dr. M. SAKAI (EUM) for loan or donation of valuable material.